REMARKS

The above mentioned Office Action has been carefully considered.

Claims 1 - 18, 24 and 32.

Claims 19 - 23, 25 - 31 and 33 and 46 are now present in this application.

By this amendment, the number of claims now present in this application has increased to 26 claims. Therefore, a check in the sum of $108.00 is forwarded herewith to cover the 6 claims in excess of 20 claims now present in this application. It is noted that the applicant of this application no longer qualifies as a small entity, where the excess claims fee covers a non-small entity.

The claims have been amended to overcome the examiner's rejection thereof as being indifinite under 35 U.S.C. 112. Accoridngly, it is respectfully requested that this indifinite rejection be withdrawn.

Batches for the production of refractory shaped bodies are well known in the prior art, so that the materials therein, particularly the refractory metal oxide components, are also well known to those skilled in the art. Therefore, it is not understood why all the ingredients of these batches must be set forth in the specification, no less why it is required that all the ingredients be set forth in the claims. However, for a better understanding, we have indicated in the specification that references may be made to U.S. Patent No. 5,382,555 and also to U.S. Patent No. 5,338,711, to determine the oxide components of the refractory body.

Accordingly, a person who is skilled in the art knows that the refractory metal oxide component contains Al_2O_3 and other known compounds. In this specification, and particularly in claim 24 (versionof June 18, 2002), it is claimed that "the refractory, Al_2O_3-containing metal oxide main component includes natural raw materials selectd from a sillimanite group and/or a bauxite and/or a refractory clay and/or synthetic raw materials, such as a sintered mullite, a calcined alumina, a sintered conrundum and/or a fused conrundum".

The compositions of the above materials are as follows:

1) Sillimanite consists of Al_2O_3 (Alumina), and SiO_2 (Sillicon (IV) dioxide).
2) Bauxite consists of Al_2O_3 (Alumina) and Fe_2O_3 (Iron (III) trioxide), SiO_2 (Sillicon(IV) dioxide), TiO_2 (Titanium (IV) dioxide).
3) Mullite consists of Al_2O_3 (Alumina) and SiO_2 (Sillicon (IV) dioxide).
4) Conrundum consists of Al_2O_3 (Alumina), K_2O (Potassium Oxide), and Na_2O (Sodium Oxide).

The compositions of the materials are disclosed in "Taschenbuch Feuerfeste Werkstoffe, 3. Auflage, Seite 478-481" for Sillimanite, Mullite, and Conrundum (see enclosures).

The composition of Bauxite is disclosed in "Rompps Chemie Lexikon, Band 1: A-Cl, 8. Auflage, Seite 378-379" (see enclosures).

It is noted, that the main component also contains Fe_2O_3, SiO_2 or TiO_2 in different amounts. The names of the chemcial compounds are:

Fe_2O_3 : Iron (III) Trioxide;

SiO_2 : Sillicon (IV) dioxide; and

Tio_2 : Titanium (IV) dioxide.

The U.S. 5,338,711 Patent includes high alumina refractory mixes and shapes with a high resistance to an aluminum pentration made from a mix comprising at least about 60% by weight aluminum oxide, about 1% to 5% by weight boron phosphate, and about5% to 15% by weight of silicon carbide, and for each 100 parts by weight of the mix a phosphorus binder in an amount sufficient to bind the mix. The boron phosphate is utilized to increase the penetration resistance without any loss of its hot strength or to eliminate negative effects during processing to form the shape. As to the source of aluminum oxide used in forming the brick, it is preferred to utilize a bauxite whch contains about 85% to 90% aluminum oxide. It is further mentioned that a decrease in the physical properties occurred after burning 2300° F. Thus, this composition should be heated to temperatures less than 2300° F.

In contrast to the U.S. 5,338,711 Patent, the present invention relates to a refractory batch which has an improved alkali resistance. The composition of the present invention comprises a refractory, Al_2O_3 - containing metal oxide main component, which contains 40 to 60% by weight of Al_2O_3, a phosphate bond and finally particulate SiC, wherein the refractory metal oxide main component comprises 82 to 97% by weight of the total content and only 40 to 60% by weight thereof relates to Al_2O_3. Furthermore, it is preferred in the present invention to fire the shaped bodies at a sintering temperature of 2300° F. Thus, the problem solution apprach is different in the present invention and in the U.S. 5,338,711 Patent.

DE 36 33 816 and U.S. 4,751,204 were cited in the corresponding European patent procedure of the above-identified patent application. These two documents correspond to the closest prior art in view of the present invention. However, these two documents do not provide a homogeneously fixed clay-containing refractory shaped body with improved alkali resistance without defecgs in the microstructure in terms of a black core and a method of producing.

The Examiner's attention is directed to the following experiement:

Experiment concerning the microstructure (black core) of the refractory shaped body

High-alumina raw materials containing 51% by weight of Al_2O_3 or 71% by weight or Al_2O_3 were used to form refractory shaped bodies with different compositions. The maximum grain size was 4 mm. The grain size distribution corresponds to a typical fuller curve. These high alumina raw materials were mixed with 5% of a refractory binding clay. The mixture also included 5% of SiC with the grain size from 0 to 0.9 mm. There wee two refractory batches produced with a high-alumina raw material containing 51% by weight of Al_2O_3 and two refractory batches with 71% by weight of Al_2O_3. These four mixtures were mixed with a binder component, whereby the two refractory batches with 71% by weight of Al_2O_3 either contained 1,6% phosphoric acid and 1,2% water or 4% lignin sulfonate. The same components were mixed to the two refractory batches with 71% by weight of Al_2O_3. These four mixtures were pressed under a pressure of 90 MPa. Then, the shaped bodies were dried at a temperature of over 100° C

and after subsequent drying the shaped bodies were fired at a sintering temperature of 1260° C.

The pictures of ENCLOSURE I SHOW the results after sintering, as follows:

PHOTO A: raw material with 51% Al_2O_3 and lignin sulfonate;

PHOTO B: raw material with 71% Al_2O_3 and lignin sulfonate;

PHOTO C: raw material with 71% Al_2O_3 and phosphoric acid; and

PHOTO D: raw material with 51% Al_2O_3 and phosphoric acid.

It is shown that the compositiojn (PHOTO D) of the present invention has a much better microstructure than the other three compositions shown in PHOTOS A,B and C.

Experiment concerning the alkali resistance

Crucibles were cut of the four shaped bodies of the first experiment with an edge length of 70 mm and an internal bove with a diameter of 40 mm. To simulate alkali attack, these crucibles were filled with 70 g of potassium carbonate. The crucibles were then closed off with a cover made from the same material and were treated in a kiln for five hours at a temperature of 1100° C.

The results are shown in the pictures, PHOTOS E, F, G and H of ENCLOSURE II.

The results after firing is that the microstructures of the comparative examples shown in PHOTOS E, F and G reveal infiltration. The shaped bodies were considerably destroyed by the alkali attack.

By contrast, the brick of the present invention shown in PHOTO H does not reveal any effect on the microstructure through the alkali attack. The shaped body is free of cracks. The alkali resistance of the shaped body according to the

invention is, surprisingly, so high that postassim carbonate has boiled over out of the crucible, since it was unable to penetrate into the microstructure of the brick.

Therefore, for the above-mentioned reasons, independent claims 19 and 26 now present in this application are believe to be patentable over the cited reference(s).

Dependant claims 20-23, 25, 27-31 and 33-46 are dependent upon claims therefore are believed to be allowable therewith for the same reasons mentioned above.

The applicants have discovered a problem in the prior art, and the applicants have formulated a concept of a solution to this problem by improving the refractory batch, and the applicants have executed this concept to effect a solution to the problem.

The applicants have described and claimed a particular structure and process which include limitations just not found, or for that matter, not even suggested in the cited reference(s) and, therefore, it is believed to avoid said reference(s) and be allowable therreover. Furthermore, it is believed that if a person skilled in the art was shown the cited reference(s) or had same at hand, the person skilled in the art would not arrrive at applicants' invention. However, if the Examiner rejects the patentability of these claims, it would be appreciated if the Examiner set forth the proposed modificatins of the applied reference(s) necessary to arrive at the claimed subject matter, and the explanations why such proposed modifications would be obvious and desirable, as set forth in M.P.E.P. 707(d), so that the applicants may make proper argument, particularly if appeal thereof is necessary.

As pointed out in re Warner, 54 CCPA 1628, 379 F.2d 1022,154 USPQ 173 (1967):

> A rejection based on Section 103 clearly must rest on a factual basis, and these facts must be interpreted without hindsight reconstruction of the invention from the prior art. In making this evaluation, all faxts must be considered. The Patent Office has the initial duty of supplying the factual basis for its rejection. It may not, because it may doubt that the inventionis patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis.

The applicants now respectfully submit that they have overcome each and every ground of objection and rejection set forth in the Patent Office Action, placing this application in condition for a favorable action.

Reconsideration of the claims is earnestly solicited, and an early Notice of Allowance is respectfully requested.

Respectfully submitted,

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